REMARKS

Claims 19-52 are pending in this application. Claims 119-127 have been added to claim the invention more fully, and claims 19 and 20 are amended for clarity. Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claim Rejection – 35 USC § 102

Claims 19-22, 25-26, 28-29, 31-32, and 34-35 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Khan *et al.*, U.S. Pat. No. 4,614,961. The Examiner contends that Khan *et al.* discloses a method of growing epitaxial layers by the process of providing a sapphire substrate, growing a buffer layer of AlN, and then growing a compound layer on the AlN buffer layer, wherein the gallium nitride layer is an AlGaN layer. The Examiner further contends that Khan *et al.* discloses AlGaN with n-type dopant concentration at approximately 10^{18} /cm^3. Applicants respectfully traverse this rejection.

Khan *et al.* simply teaches a method of preparing a UV detector having a layer of AlGaN where the AlGaN layer is not doped with an impurity. Applicants assume the Examiner is relying in part on the statement in Khan *et al.* at column 2, lines 37-42, that if the AlGaN material is too heavily doped n-type (at approximately 10^{18} /cm^3), the depletion layer will be very narrow and the electrons will tunnel through the Schottky's barrier. That statement, however, merely indicates that if AlGaN is made of an n-type material with high electron concentration, the depletion layer will not be thick enough to contain the electrons. In other words, Applicants submit that in Khan *et al.*, the phrase "doped n-type" is used in the sense of "n-type material" because no impurity is involved in doping the AlGaN material. Applicants submit that the "n-type" terminology used in Khan *et al.* comes from the fact that the nitrogen acts as a donor and the Schottky's barrier is not formed when the electron concentration is around 10^{18} /cm^3.

Khan *et al.* is silent, however, as to controlling doping of the AlGaN (e.g., with silicon) by controlling a ratio of, e.g., SiH_4 to ammonia and, hence, is silent as to controlling the conductivity or carrier concentration of AlGaN by controlling the mixing ratio. Thus, Khan *et al.* does not disclose or suggest, *inter-alia*, "setting a mixing ratio of a silicon-containing gas and other raw material gases during [the] vapor phase epitaxy at a desired value in a range over which conductivity of the gallium nitride group compound semiconductor increases substantially proportionally with [the] mixing ratio so as to obtain a desired conductivity (1/resistivity) of [the] gallium nitride group compound semiconductor,"

as recited in claim 19, or "setting a mixing ratio of a silicon-containing gas and other raw material gases during [the] vapor phase epitaxy at a desired value in a range over which carrier concentration of the gallium nitride group compound semiconductor increases substantially proportionally with [the] mixing ratio so as to obtain a desired carrier concentration of [the] gallium nitride group compound semiconductor," as recited in claim 20.

Accordingly, Applicants respectfully submit that claims 19 and 20, and therefore claims 21-22, 25-26, 28-29, 31-32, and 34-35 which depend from either claim 19 or claim 20, are patentable and respectfully request that the rejection be withdrawn.

Claim Rejections – 35 USC § 103

Claims 23, 24, 27, 30, 33, 36, and 45-52 are rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Khan *et al.* in view of Amano *et al.* Applicants respectfully traverse this rejection for at least the reasons set forth above with respect to claims 19 or 20 from which they depend. Therefore, Applicants respectfully request that the rejection be withdrawn.

Claims 119-127 are newly added to claim the invention more fully. Support for the claim language may be found throughout the specification. Claims 119-127 depend directly or indirectly from claim 20 and therefore are deemed to be allowable for at least the reasons set forth above.

CONCLUSION

In view of the foregoing, Applicants submit that the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,
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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claims 19 and 20 have been amended as follows:

19. (Amended) A method for producing a gallium nitride group compound semiconductor by using an organometallic compound vapor phase epitaxy, comprising [the steps of] :

setting a mixing ratio of a silicon-containing gas and other raw material gases during said vapor phase epitaxy at a desired value in a range over which conductivity of the gallium nitride group compound semiconductor increases substantially [in proportion to a conductivity (1/resistivity) of said gallium nitride group compound semiconductor] proportionally with said mixing ratio so as to [control] obtain a desired conductivity (1/resistivity) of said gallium nitride group compound semiconductor [at a desired value]; and

forming said gallium nitride group compound semiconductor by feeding said silicon-containing gas and other raw material gases at a mixing ratio set above.

20. (Amended) A method for producing a gallium nitride group compound semiconductor by using an organometallic compound vapor phase epitaxy, comprising [the steps of]:

setting a mixing ratio of a silicon-containing gas and other raw material gases during said vapor phase epitaxy at a desired value in a range over which carrier concentration of the gallium nitride group compound semiconductor increases substantially [in proportion to an electron concentration of said gallium nitride group compound semiconductor] proportionally with said mixing ratio so as to [control] obtain a desired [a] carrier concentration of said gallium nitride group compound semiconductor [at a desired value]; and

forming said gallium nitride group compound semiconductor by feeding said silicon-containing gas and other raw material gases at a mixing ratio set above.

End of Appendix